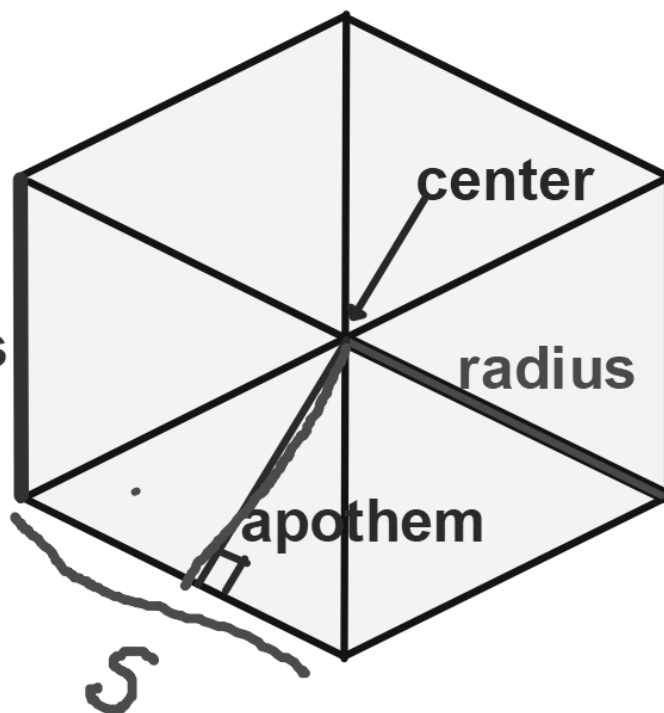


Unit 8 Lesson 4 Area of Regular Polygons and Composite Figures
OBJ: Find the area of regular polygons and composite figures. [11-4]

Apothem- A segment that is drawn from the center of a regular polygon perpendicular to a side of the polygon.

*In a regular polygon all apothems are congruent.



How many sides? 6

How many triangles? 6

How do you find the area of a triangle?

$$\frac{1}{2}bh$$

What pieces of the diagram will you use to find the area of one of the small triangles?

Unit 8 Lesson 4 Area of Regular Polygons and Composite Figures
OBJ: Find the area of regular polygons and composite figures. [11-4]

$$\text{area of a regular polygon} = \frac{1}{2} \times \underline{\text{perimeter}} \times \text{apothem}$$

OR

Steps

1) divide the polygon into triangle
each triangle will be isosceles

2) find the measure of the central angle (divide 360 by # of sides)

3) find the measure of sides the polygon and the apothem

4) find the area of each triangle

5) multiply by the number of
triangle/sides

* $A = \frac{1}{2}ap$ *

↓

$P = s \cdot \# \text{ sides}$

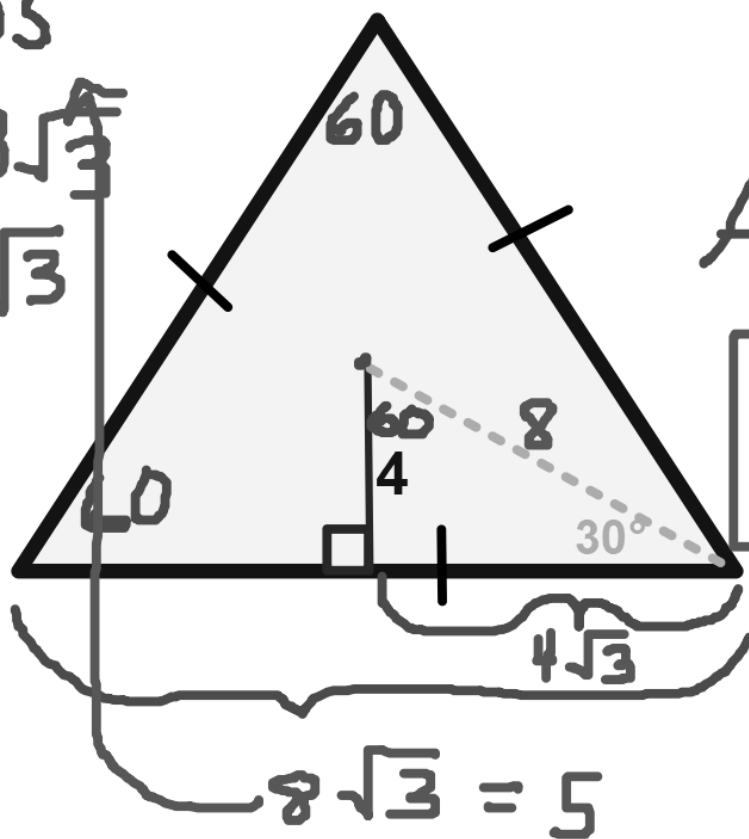
Unit 8 Lesson 4 Area of Regular Polygons and Composite Figures
 OBJ: Find the area of regular polygons and composite figures. [11-4]

Using special Triangles

$$P = 3s$$

$$P = 3 \cdot 8\sqrt{3}$$

$$24\sqrt{3}$$



$$A = \frac{1}{2} a P$$

$$A = \frac{1}{2} (4)(24\sqrt{3})$$

$$A \approx 83.1$$

Unit 8 Lesson 4 Area of Regular Polygons and Composite Figures
OBJ: Find the area of regular polygons and composite figures. [11-4]

Using trigonometry

$$P = 5 \cdot 10 = 50$$

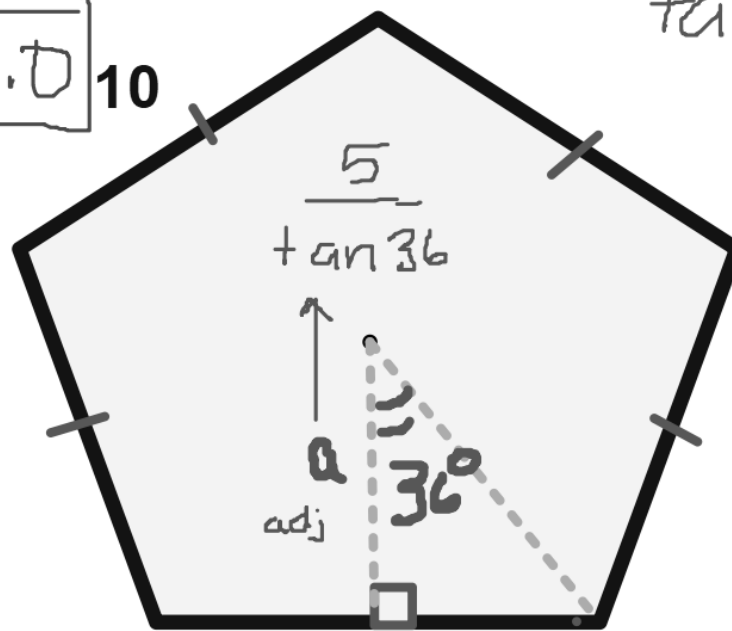
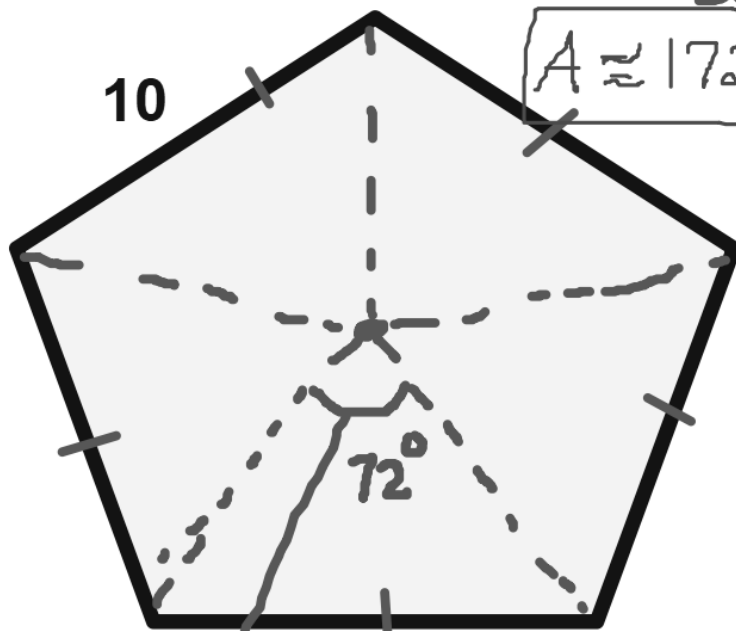
$$A = \frac{1}{2} a P$$

$$A = \frac{1}{2} \left(\frac{5}{\tan 36} \right) (50)$$

$$A \approx 172.0$$

$$\tan 36 = \frac{5}{a}$$

$$a = \frac{5}{\tan 36}$$



$$360 \div 5 = 72 \div 2 = 36$$

$$360 \div \# \text{ sides} \div 2 \longrightarrow 36$$

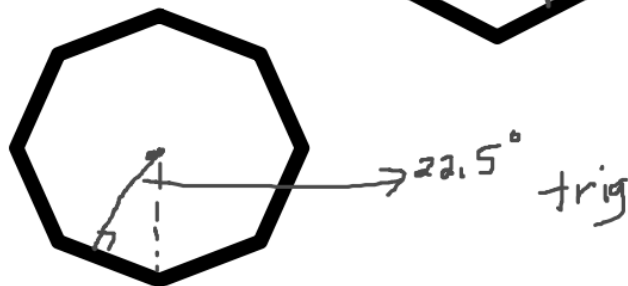
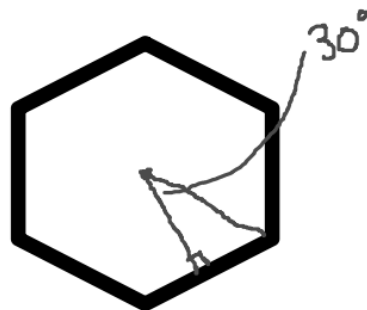
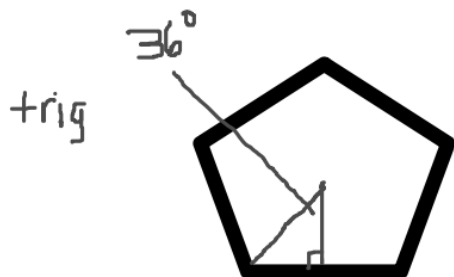
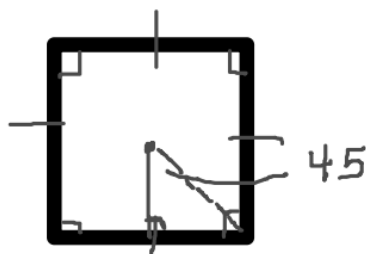
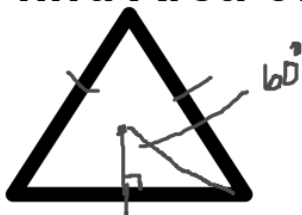
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Unit 8 Lesson 4 Area of Regular Polygons and Composite Figures

OBJ: Find the area of regular polygons and composite figures. [11-4]

trigonometry
soh-cah-toa

To find Area of REG. Poly

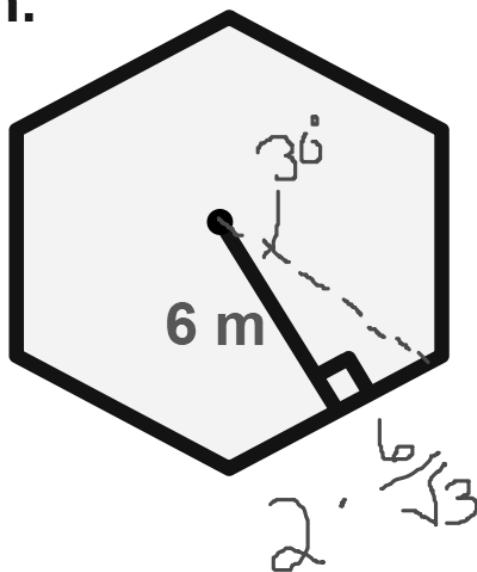


special triangles
 $45^\circ-45^\circ-90^\circ$
 $30^\circ-60^\circ-90^\circ$

Unit 8 Lesson 4 Area of Regular Polygons and Composite Figures
OBJ: Find the area of regular polygons and composite figures. [11-4]

Your Turn.

Find the area of the regular hexagon, round to the nearest tenth.



$$s = \frac{12}{\sqrt{3}}$$

$$A = \frac{1}{2} a P$$

$$a = 6 \quad A = \frac{1}{2} (6) \frac{72}{\sqrt{3}} \approx \boxed{124.7 \text{ m}^2}$$

$$P = 6s$$

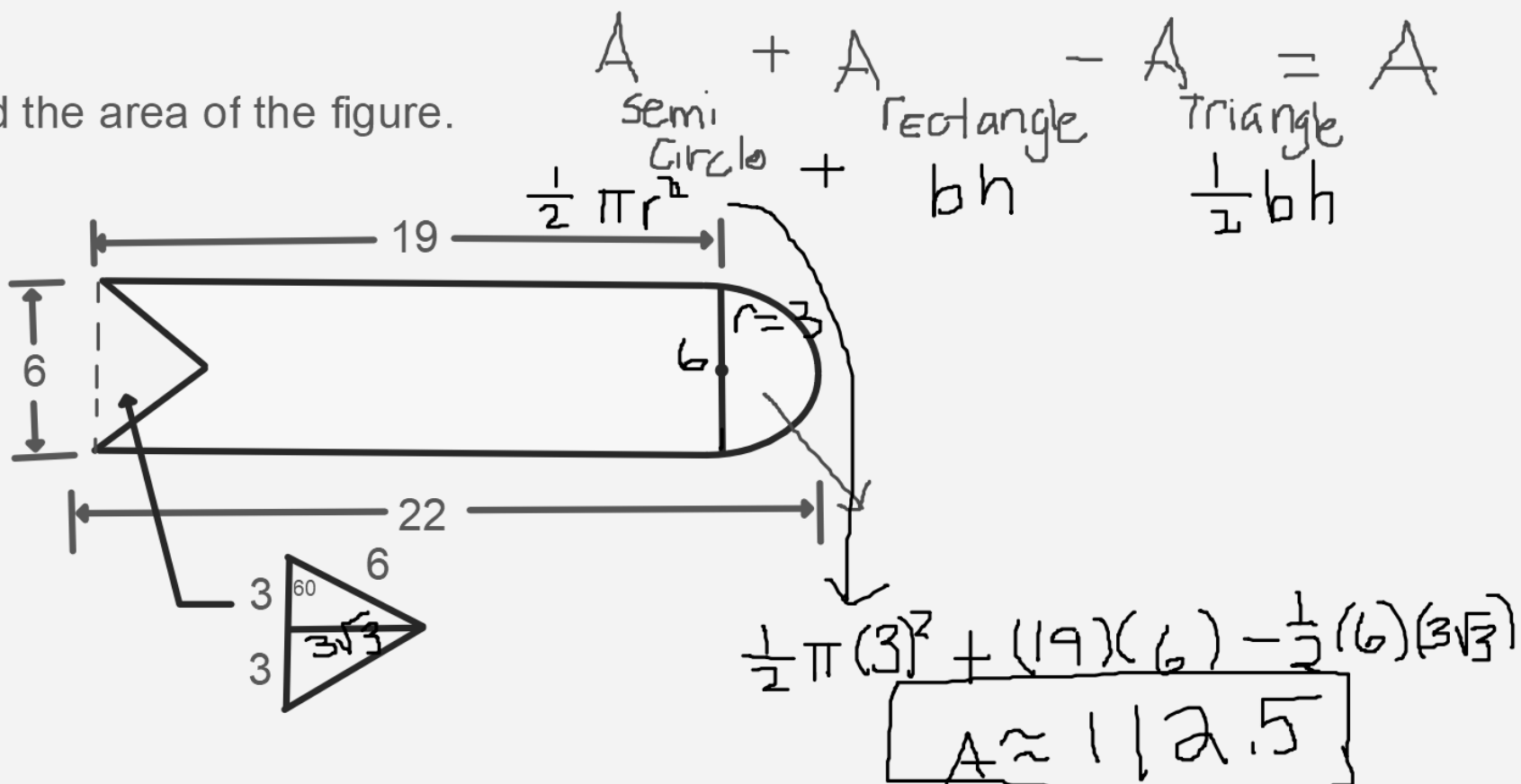
$$P = 6 \cdot \frac{12}{\sqrt{3}} = \frac{72}{\sqrt{3}}$$

Unit 8 Lesson 4 Area of Regular Polygons and Composite Figures

OBJ: Find the area of regular polygons and composite figures. [11-4]

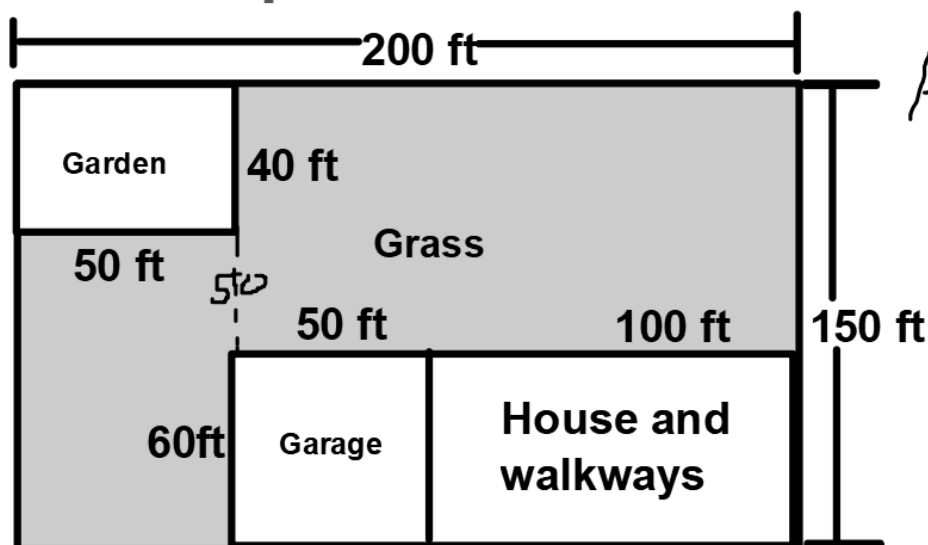
A composite figure is a figure that cannot be classified into the specific shapes that we have studied. To find areas of composite figures, separate the figure into shapes of which we can find the area. The sum of the areas of each is the area of the figure. Sometimes instead of adding the parts we might also have to subtract the area of one shape from the area of another shape.

Find the area of the figure.



Unit 8 Lesson 4 Area of Regular Polygons and Composite Figures
OBJ: Find the area of regular polygons and composite figures. [11-4]

Example 3



Method 1, Break apart/add

$$A = A_{\text{rect}_1} + A_{\text{rect}_2}$$

$$(110)(50) + (40)(150)$$

$$A = 19,000 \text{ ft}^2 \div 9$$

$$A = 2112 \text{ yd}^2$$

The Kanes are planning to sod some parts of their yard. Find the number of square yards of grass needed.

Method 2, Whole - parts

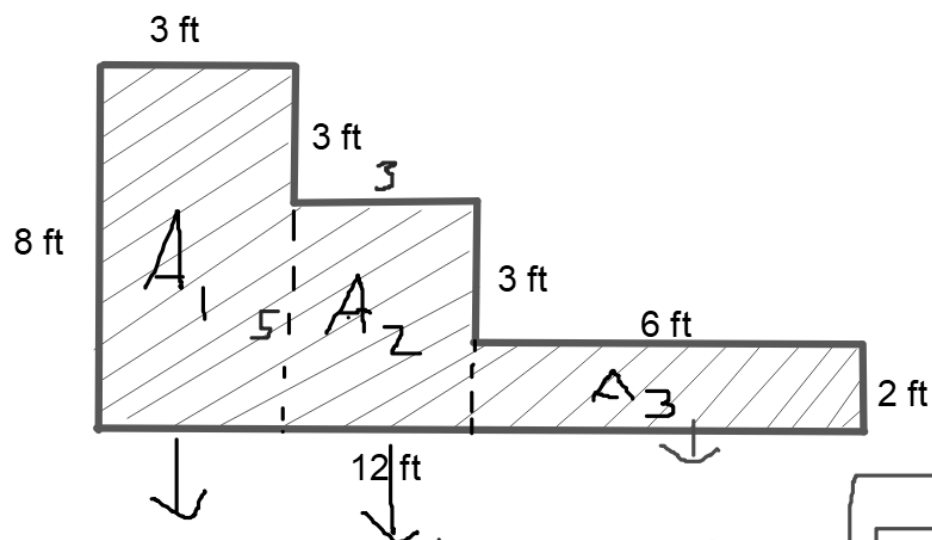
On the floor plan, all angles are right angles)

$$(1 \text{ yd}^2 = 9 \text{ ft}^2)$$

Unit 8 Lesson 4 Area of Regular Polygons and Composite Figures

OBJ: Find the area of regular polygons and composite figures. [11-4]

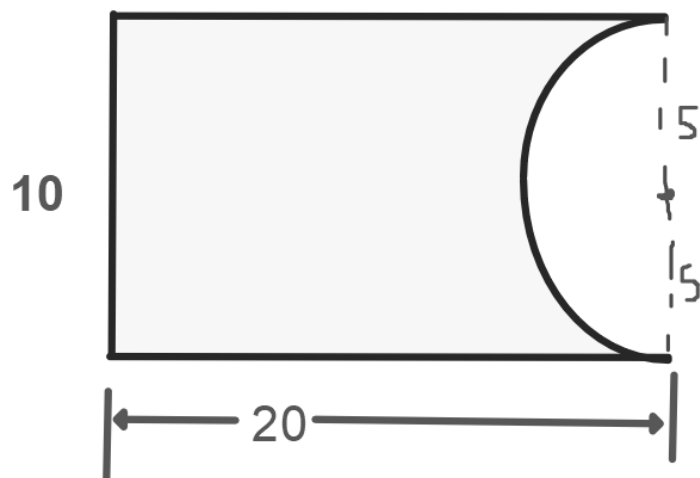
Find the area of the shaded region. (All angles are right angles.)



$$(3)(8) + (5)(3) + (6)(2) = 51 \text{ ft}^2$$

Unit 8 Lesson 4 Area of Regular Polygons and Composite Figures
OBJ: Find the area of regular polygons and composite figures. [11-4]

Find the area of the figure.



$$A_{\text{rect}} - A_{\text{Semi circle}} = A_{\text{shape}}$$
$$(20)(10) - \frac{1}{2} \pi (5)^2 \approx \boxed{160.7}$$